

# Human Skin Cell Explants Exposed to UV Radiation: The Benefits of Using AC-11® in an Oral Model

Summary of Study August 2008  
Laboratoire BIO-EC, Longjumeau, France

The purpose of this study conducted by a leading cosmetics/cosmeceuticals laboratory in France was to determine if AC-11®, administered orally, produces benefits to skin health similar to those observed in previous topical research models. Results were measured pre and post treatment with AC-11®, after exposure to varying levels of UV radiation.

The BIO-EC study showed significant improvements to skin health at a minimum AC-11® dosage level of 250mgs.<sup>1</sup>

## Results: Oral Use Skin Benefits

- (1) Skin morphology: It was established that AC-11® increased the total number of cells surviving after exposure to UV radiation.
- (2) Decrease in TT-dimer formation: AC-11®-treated samples showed a significant decrease in TT-dimer formation (early stage skin cancer or Actinic Keratosis). This data is consistent with Optigenex topical research findings.
- (3) Epidermal layer thickness: AC-11® slightly increased epidermal thickness.
- (4) Enhanced DNA repair: Based upon Ki-67 immuno-staining, enhanced DNA repair was measured in samples treated with AC-11®. Ki-67 also demonstrated increased cellular activity and DNA repair.
- (5) Increase in collagen III production: AC-11® significantly increased collagen III over-expression. Collagen III is associated with healing as it relates to increased activity in granulation tissue. This activity is important as a healthy response to skin damage resulting from over exposure to the sun.

Interested parties may contact Optigenex in writing to request further information regarding the BIO-EC study.

---

<sup>1</sup> Optigenex recommends minimum oral dosage levels of 250 to 700 mg. in accordance with efficacy standards established and validated through previous studies.

**Protection and preventive activity of AC-11 after UV irradiation  
and anti ageing activity on human skin explants maintained in  
survival**

**Study 08E1576**

**Tested Products:**

- AC-11 at 10µg/ml
- AC-11 at 25µg/ml

**Study report delivered by BIO-EC, the 05 August 2008  
Study director: M. P. Gasser**

**Study 08E1576 according to the quotation D08-77-2**

Study promoter : **NUTRITION ACT**  
Mr Ken Yamauchi  
E-mail:yamauchi@n-act.co.jp  
Tel:+ 03-5475-7313  
Fax:+ 03-5475-7314

Study executed by : **Laboratoire BIO-EC**  
1 chemin de Saulxier  
91160 Longjumeau  
Telephone : 01 69 41 42 21  
Telecopy : 01 69 41 61 65  
e-mail : info@bio.ec.fr  
www.bio-ec.fr

Technical manager : **L. Peno Mazzarino**

Study director : **P. Gasser**

Quality manager : **D. Bouzoud**

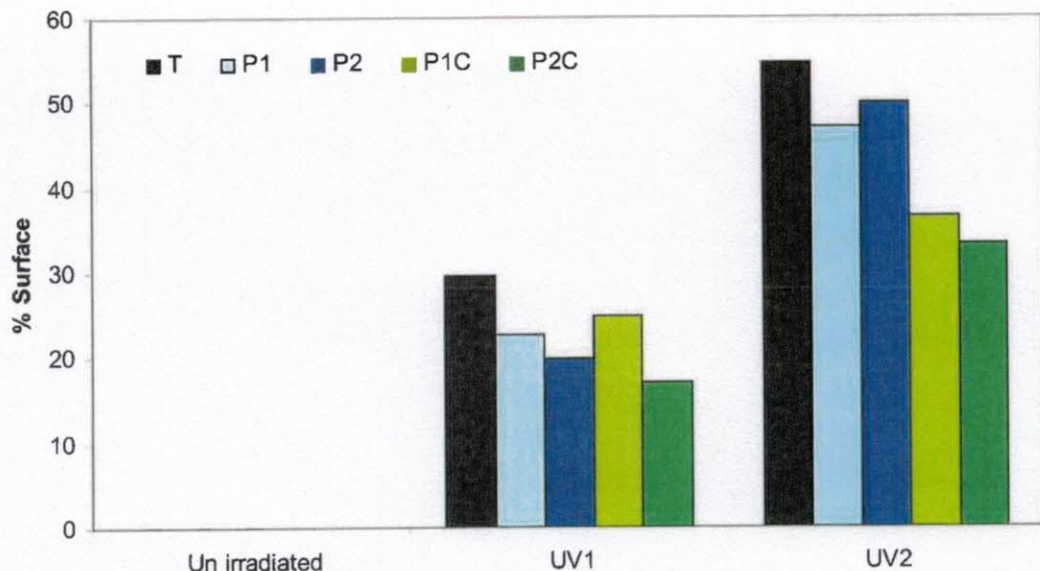
### A- Thymin dimers Immunostaining

The thymin dimers positives cells were counted and the percentage of positive cells versus the total number of cells in the epidermis was calculated. This percentage was calculated for around 300 cells

#### % of positive cells

% of surface	Un irradiated		UV1: 50 mJ/cm <sup>2</sup>		UV2: 100 mJ/cm <sup>2</sup>	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
T (Day 0)	0					
T	0		29,5		54,6	
P1	0		22,7		47,1	
P2	0		19,9		49,8	
P1C			24,8		36,5	
P2C			17,1		33,2	

#### Thymine dimers UV induced in the epidermis



The irradiation UV1 (50 mJ/cm<sup>2</sup>) induces a significant increase of the expression of thymine dimers, compared to the untreated and unirradiated batch.

- The 3 days pretreatment with the tested product at 10µg/ml (P1UV1) induces a decrease of 23%, compared to the untreated and irradiated batch
- The 3 days pretreatment with the tested product at 25µg/ml (P2UV1) induces a decrease of 33%, compared to the untreated and irradiated batch

- The 3 days pretreatment completed with a 1 day curative treatment with the tested product at 10µg/ml (P1UV1C) induces a decrease of 14%, compared to the untreated and irradiated batch
- The 3 days pretreatment completed with a 1 day curative treatment with the tested product at 25µg/ml (P2UV1C) induces a decrease of 42%, compared to the untreated and irradiated batch

The irradiation UV2 (100 mJ/cm<sup>2</sup>) induces an increase of the expression of thymine dimers, compared to the untreated and unirradiated batch.

- The 3 days pretreatment with the tested product at 10µg/ml (P1UV2) induces a decrease of 14%, compared to the untreated and irradiated batch
- The 3 days pretreatment with the tested product at 25µg/ml (P2UV2) induces a decrease of 9%, compared to the untreated and irradiated batch
- The 3 days pretreatment completed with a 1 day curative treatment with the tested product at 10µg/ml (P1UV2C) induces a decrease of 33%, compared to the untreated and irradiated batch
- The 3 days pretreatment completed with a 1 day curative treatment with the tested product at 25µg/ml (P2UV2C) induces a decrease of 39%, compared to the untreated and irradiated batch

**The results obtained by counting are close similar to those obtained by image analysis (%Surface).**